Chapter XV

An Integrated Network Management Framework Using CORBA, Mobile Agents and Web-Based Technologies

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ABSTRACT

Today’s network management is still dominated by the platform-centered paradigm based on client/server technologies. This centralized approach has drawbacks in scalability, reliability, efficiency and flexibility, and is unsuitable for large and heterogeneous networks. Modern networks require an open management architecture, which can provide standard interfaces for information sharing among management systems, has extensibility for handling
change quickly, and has means to manage large networks. Emerging technologies such as Web-, CORBA-, and Mobile Agent-based technologies represent an excellent opportunity to solve these problems. In this chapter a new Web-based network management framework is proposed, which combines the strengths of these novel ways of managing networks and the results of a prototype implementation are discussed. Our preliminary results indicate that the integration of Web-, CORBA-, and Mobile Agent-based technologies within an Integrated Network Management System framework can dramatically improve the performance of the networked environment.

BACKGROUND

Global competition has led to a greater reliance on information processing systems. Networks are required to extend beyond physical boundaries to support virtual corporations, virtual LANs, inter-enterprise systems, inter-networking, outsourcing and electronic commerce. Despite the fact that networks are becoming larger and more complex, today’s network management is still dominated by the platform-centered paradigm based on client/server (C/S) technologies (e.g., SNMP). This centralized approach has drawbacks in scalability, reliability, efficiency and flexibility, and is unsuitable for large and heterogeneous networks (Goldszmidt & Yemini, 1998; Lazar, Saracco & Stadler, 1997; Yemini, 1993).

Numerous studies have shown that new technologies such as Mobile Agents (MA), CORBA and Web technologies have individually solved some of the problems associated with network management (Baek, Ha & Park, 1998; Baldi, Gai & Picco, 1997; Bieszczad, Pagurek & White, 1998; Cheikhrouhou, Conti, Labetoulle & Marcus, 1999; Deri & Ban, 1997; Goldszmidt & Yemini, 1998; Haggerty & Seethapaman, 1998; He & Shayman, 2000; Hegering, Abeck & Neumair, 1999; Liotta, Pavlou & Knight, 2002; Luo, Confrey & Trivedi, 1999; Terplan, 1999; Wren & Gutiérrez, 1999). However, few studies have looked into the impact of combining the strengths of these new technologies on an integrated network management system (INMS). Integrated management of a networked system involves several disciplines and different levels of managed objects. In recent years, the emphasis in network management has moved from managing machines to managing functionalities and the performance of these functionalities. On the other hand, there are no widely established methods today for dealing with large numbers of network elements. Managing large enterprise networks requires powerful abstractions that capture the essentials of the state of the network rather than the details.
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